

Things to Know, Understand and Do For Chapter 6: Chemical Bonding

By the end of Chapter 6, you should

Know how to...
Define the terms chemical bond, covalent bond, ionic bond, molecule, formula unit, bond energy, bond length, octet rule, lone pair, unshared pair, resonance, lattice energy, metallic bond, polarity, dipole, hydrogen bonds, London dispersion force, intermolecular force.
Predict if compound is ionic or covalent only using periodic trends of electronegativities as outlined on the periodic table.
Use electronegativity trends (outlined on periodic table) to determine if bond is polar-covalent, non-polar covalent or ionic. (even or uneven electron sharing)
Explain how covalent bonds form using orbital notation.
Draw Lewis Structure for small molecules and ions.
Draw structures with multiple bonds forming.
Draw resonance structures of appropriate molecules.
Draw isomers of compounds with the same molecular formula.
Explain how ionic bonds form, using orbital notation.
Explain a crystal lattice, and how it gives certain properties to ionic compounds.
Explain how metallic bonding occurs through the electron sea model, and how this explains properties of metals (conductivity, malleability, etc.)
Use VSEPR (valence shell electron-pair repulsion theory) to explain the molecular geometry and bond angles of molecules or ions.
Predict bond angles for any angle on a given molecule or ion.
Use molecular geometry and bond dipoles to predict molecular polarity.
Define the three different types of intermolecular forces and rank them by their strengths of attractions.

understand...
Why and how chemical bonds form.
The difference(s) between ionic and covalent bonds.
Understand and apply octet rule; recognize exceptions to octet rule: <ul style="list-style-type: none"> Diminished octet: Be-4 electrons (2 e⁻ pairs); B-6 electrons (3 e⁻ pairs) Expanded octet: Elements in 3rd period or higher since they have d-orbitals to use
When to draw resonance structures and what resonance means.
The basic trends in how many bonds elements form, along with how many unshared electron pairs they have.
How the different properties of compounds (melting point, electrolytic props, etc.) are resulting from the types of bonds they contain.
Why some molecules are non-polar or polar.
How intermolecular forces can affect the properties of compounds.
That intermolecular forces are just forces of attraction and they are NOT bonds.

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